

MEMORANDUM

To: Alan Wallace, Williams Kastner
From: Brad Lincoln, PE *BLZ*
Subject: Rolling Sunrise – Traffic Impact Review
Date: October 10, 2014
Project: GTC #14-226

Gibson Traffic Consultants, Inc. (GTC) has been retained to review the traffic impacts of the Rolling Sunrise development. The review includes reviewing the need for a traffic impact analysis and analyzing the adequacy of the surrounding roadways to handle the traffic generated by the development.

1. BACKGROUND

The Rolling Sunrise development is located in the City of Bainbridge Island between Hyla Avenue NE and the intersection of Sunrise Drive NE at NE Duncan Lane. The development is currently proposed to consist of 7 total units. The development is proposed to have 4 units access Sunrise Drive NE and have 3 units access Hyla Avenue NE.

2. NEED FOR A TRAFFIC IMPACT ANALYSIS

Bainbridge Island Municipal Code (BIMC) 15.40 identifies the criteria for when a traffic impact analysis is required for a development. A traffic impact analysis was not performed for the development since it was determined that development did not meet the threshold for requiring a traffic impact analysis. BIMC 15.40.060 states the only exemptions from requiring a traffic impact analysis are:

“...proposed development or improvement that generates less than 50 average daily trips (ADT) or five a.m. or five p.m. peak-hour trips per the latest edition of the ITE Trip Generation Manual.”

The trip generation calculations for the 7 single-family residential units, ITE Land Use Code 210, are summarized in Table 1.

Table 1: Trip Generation Summary

| 7 New Single-Family Residential Units | Average Daily Trips | | | AM Peak-Hour Trips | | | PM Peak-Hour Trips | | |
|---|---------------------|----------|-------|---------------------|----------|-------|---------------------|----------|-------|
| | Inbound | Outbound | Total | Inbound | Outbound | Total | Inbound | Outbound | Total |
| Generation Rate | 9.52 trips per unit | | | 0.75 trips per unit | | | 1.00 trips per unit | | |
| Splits | 50% | 50% | 100% | 25% | 75% | 100% | 63% | 37% | 100% |
| Trips | 34 | 33 | 67 | 1 | 4 | 5 | 4 | 3 | 7 |

It should also be noted that if the ITE regression equation was utilized, based on the recommended ITE practice, the development would generate 91 average daily trips with 10 PM peak-hour trips.

Table 1 shows that all of the parameters of BIMC 15.40.060 are met, even utilizing the lower trip generation from the average rate, and therefore a traffic impact analysis for the Rolling Sunrise development should have been completed. It is important to note that the fact that the development is proposed to have access to two different roadways does not affect whether or not a traffic impact analysis is required; the requirement is solely based on the trip generation of the entire development.

The traffic impact analysis could include all, or some, of the following items:

- Sight distance at the site entrances
- Comparison of surrounding roadways to applicable standards
- Impacts to surrounding intersections
- Pedestrian and bicycle facilities
- Collision history along impacted roadways
- Mitigation/improvements to roadways

It is important to note that the analysis, findings and conclusions of the traffic impact analysis, Revised Code of Washington (RCW) 57.17 and the State Environmental Policy Act (SEPA) provide a mechanism for the City of Bainbridge Island to require the developer to improve the surrounding roadway system.

3. ROADWAY ADEQUACY

GTC staff reviewed documentation, including the Hearing Examiner report dated July 18, 2014, pertaining to the Rolling Sunrise development and conducted field measurements of the roadways surrounding the Rolling Sunrise development. The Hearing Examiner report and the field measurements clearly identify that the surrounding roadways are deficient when compared to City of Bainbridge standards and national standards.

3.1. Hyla Avenue NE

Hyla Avenue NE is currently a dirt/gravel road with between approximately 10 feet and 12 feet of travel way, based on GTC staff measurements. Along both sides there are trees and vegetation that establish the limits of the clear travel way. There are approximately 13 existing single-family residential units along the southern portion of Hyla Avenue NE. Hyla Avenue NE does not have pedestrian facilities and there are several locations where trees overhanging the roadway limit the height along the traveled way. This is particularly important when considering the Fire Marshal requirement, documented in the Hearing Examiner report, that roadways serving the development shall have 12 feet of drivable width and 13.5 feet of overhead clearance.

3.2. Sunrise Drive NE/NE Duncan Lane

Sunrise Drive NE is paved for the majority of the length and has between approximately 8 feet and 12 feet of traveled way. There are only 11 existing single-family residential units that have access to Sunrise Drive NE. NE Duncan Lane provides access to only 4 single-family residential units. The traveled way on both roadways is limited by vegetation and power poles. There are also potential sight distance issues due to vertical curves along Sunrise Drive NE.

3.3. Roadway Adequacy Findings

The field measurements by GTC staff show that Hyla Avenue NE, Sunrise Drive NE and NE Duncan Lane are all deficient when compared to City of Bainbridge Island standards and national standards. The minimum City of Bainbridge Island roadway standards for roadways serving 20 lots or less, which would be applicable to Hyla Avenue NE and Sunrise Drive NE, require at least a 12-foot pavement width. Additionally, if a 12-foot pavement width were to serve 2-way traffic, turnouts with 18-feet of pavement width every 300 feet would be required.

The national roadway standards, which would be considered acceptable for vehicular traffic, pedestrians and safety, are based on the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets*. These AASHTO standards were utilized when establishing the City of Bainbridge Island roadway standards. The AASHTO minimum local rural road section based on Table 5-5, which would be most applicable to Hyla Avenue NE and Sunrise Drive NE, is 18 feet (based on a roadway with a design speed of 15 mph and less than 400 average daily trips). The 18 feet includes 2-foot shoulders on each side of the roadway. It is important to note that the minimum urban roadway standards include at least 20 feet of traveled way with separate pedestrian facilities.

The last official posted speed limit approaching Hyla Avenue NE and Sunrise Drive NE is 25 mph. However, the narrowness of the roadways is likely to reduce the travel speed to below 20 mph. The minimum stopping sight distance for 25 mph is 150 feet and for 20 mph it is 115 feet. Since the roadways are both 1-lane roadway, the stopping sight distance should be at least doubled to ensure two approaching vehicles can stop. (Note: Given the governing equation for stopping sight distance has one of the velocity parameters squared, doubling these numbers is a simplistic estimation). It is important to note that these stopping sight distances are not based on a dirt/gravel road and may need to be increased for Hyla Avenue NE.

The existing Hyla Avenue NE road alignment, specifically the 90-degree horizontal curve at the proposed access, and encroaching foliage does not appear to provide the sight distance needed for opposing vehicles to safely stop. Although Sunrise Drive NE does not have a horizontal curve, there are several vertical curves that could limit the available sight distance. The addition of the Rolling Sunrise development will increase the likelihood of opposing vehicles meeting on these narrow roadways. This is especially a concern in areas where there is insufficient sight distance.

4. CONCLUSIONS

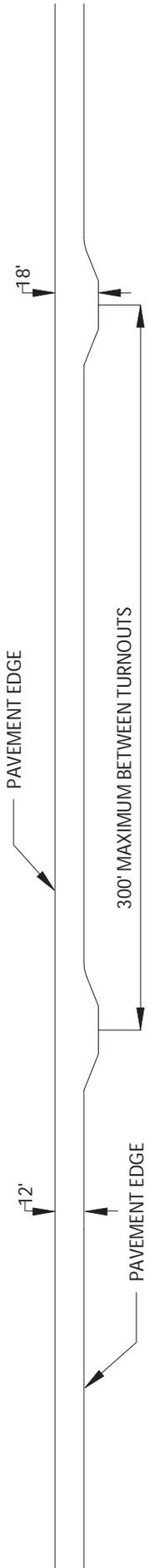
The roadways that would provide access to the Rolling Sunrise development, primarily Hyla Avenue NE and Sunrise Drive NE, do not meet the minimum standards of the City of Bainbridge Island or AASHTO, including road width, pedestrian facilities and approaching sight distance. Additionally, they do not meet the requirements for the Fire Marshal for safe access. All of these factors show that these roadways pose a potential safety hazard for accessing the Rolling Sunrise development, especially the horizontal curve on Hyla Avenue NE at the development's proposed access. The access is likely to have adequate sight distance for vehicle leaving the development. However, there is not sufficient sight distance through the horizontal curve, the vehicles leaving the Rolling Sunrise development would create a new conflict location and increase the likelihood opposing vehicles meeting along Hyla Avenue NE.

The Rolling Sunrise development should be required, under RCW 58.17.110 and SEPA, to analyze the impacts of the development, including roadway deficiencies and safety concerns, in a traffic impact analysis prior to preliminary plat approval. The traffic impact analysis should identify the necessary improvements to the surrounding roadways, including safety improvements. The available right-of-way along Hyla Avenue NE and Sunrise Drive NE is approximately 35 feet, based on measurements from City of Bainbridge Island Assessor's data. This available right-of-way is wide enough to accommodate the City of Bainbridge Island standard roadway width, including the turnout width, plus pedestrian and drainage facilities.

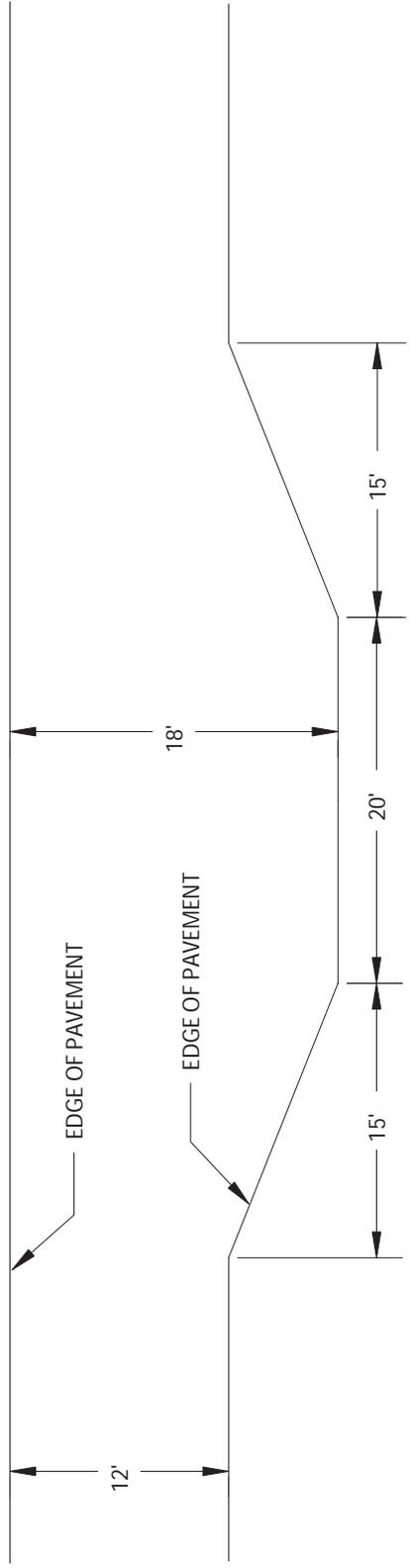
Attachments

ROADS AND STREETS

| Characteristic | 20 Lots or Less | 10 Lots or Less | 1 or 2 Lots |
|--|---|--------------------------------------|---|
| ADT | about 200 | about 100 | about 10 to 20 |
| Design Speed (MPH) | 25 | 25 | 20 |
| Min. Horizontal Curve (ft) | 160 | 160 | 100 |
| Min. Tangent between Reverse Curves (ft) | 100 | 100 | |
| Max. Grade (%) | 12 | 12 | 12 |
| Min. Gutter Line Grade (%) | 1 | 1 | 1 |
| Min. Curve Radii (ft) | 25 | 25 | 25 |
| Min. Stopping Sight Distance (ft) | 150 | 150 | 100 |
| Min. Pavement Width (ft) | 12 2-way traffic with turnouts every 300 ft or less, no parking allowed | 12 1-way loop, no parking allowed | 12 2-way traffic without turnouts, no parking allowed with Engineering & Fire approval |
| | <i>OR</i> | | |
| | 12 1-way loop, no parking allowed if built-in fire protection is provided in all residences accessed | | |
| Min. ROW Width (ft) | 30 | 30 | |
| Min. Lane Width (ft) | 12 | 12 | |



TURNOUT LOCATIONS FOR ONE LANE ROADWAYS



TURNOUT DETAIL

NOTE:
TRAFFIC VOLUMES: TO BE DETERMINED

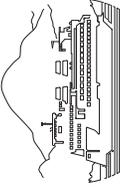
| | | |
|---|--|--------------------------|
|  | CITY OF BAINBRIDGE ISLAND STANDARD DETAILS | |
| | STREET STANDARDS RESIDENTIAL SUBURBAN TURNOUTS | |
| REV. | APPROVED <i>Jeffrey M. Jensen</i> 4/18/97 CITY ENGINEER | DATE |
| | | DWG. NO. 7-067 |

Table 5-5. Minimum Width of Traveled Way and Shoulders

| Metric | | | | | U.S. Customary | | | | |
|---------------------|---|--------------------|------------------|------------------|--------------------|--|------------------|-----------------|-----------------|
| Design Speed (km/h) | Minimum Width of Traveled Way (m) for Specified Design Volume (veh/day) | | | | Design Speed (mph) | Minimum Width of Traveled Way (ft) for Specified Design Volume (veh/day) | | | |
| | under 400 | 400 to 1500 | 1500 to 2000 | over 2000 | | under 400 | 400 to 1500 | 1500 to 2000 | over 2000 |
| 20 | 5.4 | 6.0 ^a | 6.0 | 6.6 | 15 | 18 | 20 ^a | 20 | 22 |
| 30 | 5.4 | 6.0 ^a | 6.6 | 7.2 ^b | 20 | 18 | 20 ^a | 22 | 24 ^b |
| 40 | 5.4 | 6.0 ^a | 6.6 | 7.2 ^b | 25 | 18 | 20 ^a | 22 | 24 ^b |
| 50 | 5.4 | 6.0 ^a | 6.6 | 7.2 ^b | 30 | 18 | 20 ^a | 22 | 24 ^b |
| 60 | 5.4 | 6.0 ^a | 6.6 | 7.2 ^b | 40 | 18 | 20 ^a | 22 | 24 ^b |
| 70 | 6.0 | 6.6 | 6.6 | 7.2 ^b | 45 | 20 | 22 | 22 | 24 ^b |
| 80 | 6.0 | 6.6 | 6.6 | 7.2 ^b | 50 | 20 | 22 | 22 | 24 ^b |
| 90 | 6.6 | 6.6 | 7.2 ^b | 7.2 ^b | 55 | 22 | 22 | 24 ^b | 24 ^b |
| 100 | 6.6 | 6.6 | 7.2 ^b | 7.2 ^b | 60 | 22 | 22 | 24 ^b | 24 ^b |
| | | | | | 65 | 22 | 22 | 24 ^b | 24 ^b |
| All speeds | Width of graded shoulder on each side of the road (m) | | | | All speeds | Width of graded shoulder on each side of the road (ft) | | | |
| | 0.6 | 1.5 ^{a,c} | 1.8 | 2.4 | | 2 | 5 ^{a,c} | 6 | 8 |

^a For roads in mountainous terrain with design volume of 400 to 600 veh/day, use 5.4-m [18-ft] traveled way width and 0.6-m [2-ft] shoulder width.

^b Where the width of the traveled way is shown as 7.2 m [24 ft], the width may remain at 6.6 m [22 ft] on reconstructed highways where there is no crash pattern suggesting the need for widening.

^c May be adjusted to achieve a minimum roadway width of 9 m [30 ft] for design speeds greater than 60 km/h [40 mph].

Right-of-Way Width

Providing right-of-way widths that accommodate construction, adequate drainage, and proper maintenance of a highway is a very important part of the overall design. Wide rights-of-way permit the construction of gentle slopes, resulting in reduced crash severity potential and providing for easier and more economical maintenance. The procurement of sufficient right-of-way at the time of the initial construction permits the widening of the roadway and the widening and strengthening of the pavement at a reasonable cost as traffic volumes increase.

In developed areas, it may be necessary to limit the right-of-way width. However, the right-of-way width should not be less than that needed to accommodate all the elements of the design cross sections, utilities, and appropriate border areas.

Medians

Medians are generally not provided for local rural roads. For additional information on medians, see Section 5.3 on "Local Urban Streets."